IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	Attorney Docket No. 2006_1151A
Tadashi MAEDA et al.	:	**Confirmation No. 1659**
Serial No. 10/586,598	:	Group Art Unit 1793
Filed July 20, 2006	:	Examiner Megha S. Mehta
FLUX FOR SOLDERING AND SOLDERING PROCESS	:	**Mail Stop: APPEAL BRIEFS-PATENTS**

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following is Appellants' Brief, submitted under the provisions of 37 CFR § 41.37.

Pursuant to the provisions of 37 CFR § 41.20, this brief is submitted with the required fee of $540.00.

I. REAL PARTY IN INTEREST

The real party of in interest is PANASONIC CORPORATION, the assignee of record, as recorded at Reel 021897 and Frame 0653 on November 24, 2008.

II. RELATED APPEALS AND INTERFERENCES

There are no related prior or pending appeals, interferences or judicial proceedings known to Appellants, Appellants' legal representative, or assignees, which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

The status of the claims is as follows.

Pending Claims: 16-39

Withdrawn Claims: 16-26

Rejected Claims: 27-39

Cancelled Claims: 1-15

Appealed Claims: 27-39

A complete copy of all of the pending claims is provided in the attached Claims Appendix.

IV. STATUS OF AMENDMENTS

An Amendment was filed on January 4, 2010, amending claims 27 and 33, and adding new claim 39. Thus, the claims are those set forth in the Amendment filed January 4, 2010.

V. SUMMARY OF CLAIMED SUBJECT MATTER

A concise explanation of the subject matter defined in the independent and dependent claims involved in the appeal is presented below.

Claim 27 is directed to a soldering process with which a first electrode having a solder portion thereon is soldered to a second electrode, wherein the process comprises:

a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and a metal powder made of a metal which has a melting point higher than that of a solder material which forms the solder portion, wherein the metal powder is in the form of scales, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode,

a second step of aligning the first electrode with the second electrode so as to locate the flux between the solder portion and the second electrode,

a third step of heating so as to melt the solder portion, so that a molten solder material from the solder portion comes in contact with the second electrode, and

a fourth step of solidifying the molten solder material after the third step.

Support for this claim can be found on page 4, lines 9-22; page 5, line 9 to page 6, line 6; page 6, line 19 to page 7, line 3; page 15, lines 15-25; and page 23, line 17 to page 24, line 5 of Appellants' specification.

Claim 33 is directed to a soldering process with which a first electrode having a solder portion thereon is soldered to a second electrode, wherein the process comprises:

a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and a metal powder in the form of scales of which constituting elements are comprised of cores and coatings around the cores, wherein the coatings are made of a metal which has a melting point higher than that of a solder material which forms the solder portion, and the flux contains the

metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode,

a second step of aligning the first electrode with the second electrode so as to locate the flux between the solder portion and the second electrode,

a third step of heating so as to melt the solder portion, so that a molten solder material from the solder portion comes in contact with the second electrode, and

a fourth step of solidifying the molten solder material after the third step.

Support for this claim can be found on page 4, lines 9-22; page 5, line 9 to page 6, line 6; page 6, line 19 to page 7, line 3; page 15, lines 15 to page 16, line 18; and page 23, line 17 to page 24, line 5 of Appellants' specification.

Dependent claim 39 is directed to the soldering process according to claim 33 wherein the cores are made of tin and the coatings are made of silver. Support for this claim can be found on page 16, lines 1-18 of Appellants' specification.

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 27-39 are unpatentable under 35 U.S.C. § 103(a) over Maeda et al. (U.S. Patent No. 6,189,771) in view of Imamura et al. (U.S. Patent Application Publication No. 2002/0185309).

VII. ARGUMENT

The rejection of claims 27-39 under 35 U.S.C. § 103(a) as being unpatentable over Maeda et al. (US 6,189,771) in view of Imamura et al. (US 2002/0185309) is respectfully traversed.

A. Claims 27-32

Claim 27 is directed to a soldering process comprising "a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and **a metal powder made of a metal** which has a melting point higher than that of a solder material which forms the solder portion, **wherein the metal powder is in the form of scales**, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode". **Thus, the process of claim 27 uses a flux which contains a metal powder in the form of scales.**

The Examiner admits that Maeda et al. do not disclose the flux composition recited in claim 27 (see Office Action of April 15, 2010, page 2, line 23).

However, the Examiner asserts that Imamura et al. disclose a method of mounting an electronic component with solder bumps to a substrate by using a flux that comprises a liquid base material 118 comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and a metal powder 116 made of a metal of which melting point is higher than that of a solder material which forms the solder portion 112, where the metal powder is in the form of scales, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, where "scales" are defined by the dictionary as "any thin, platelike piece, lamina, or flake" (see Office Action of April 15, 2010, page 2, line 24 to page 3, line 6).

Imamura et al. teach a flux paste including a base flux and metal grains having diameters smaller than diameters of the projection electrodes, and having a thickness so as to form a space between the flux paste and the electronic part when the electronic part is mounted on the mounting substrate (see paragraph [0024]). Furthermore, the reference teaches that in the first embodiment, the solder bumps 112 have a ball shape and the **metal grains 116 also have a shape having a smooth surface (specifically, spherical shape) so as to easily move when the solder bumps 112 are pressed by the connection terminals 114** (see paragraph [0070]).

Accordingly, the reference teaches that the metal grains are **spherical shapes**, rather than in the form of scales, as recited in claim 27.

Furthermore, the spherical form is essential in the Imamura et al. reference, because the metal power must easily move when the solder bumps are pressed by the connection terminals (see paragraph [0070]). Thus, one of ordinary skill in the art would understand that if the metal powder disclosed in the Imamura et al. reference were in scale form, then the metal powder would not easily move. **Therefore, the reference teaches away from "the metal powder is in the form of scales", as recited in claim 27.**

The Examiner asserts that spherical particles can be characterized as scales (see Office Action of April 15, 2010, page 6, lines 3-4). However, the Examiner's interpretation of spherical particles as scales is very unusual, far from the general understanding of scales in the art, beyond common sense and inconsistent with the disclosure of the Imamura et al. reference.

Therefore, the process of claim 27 would not have been obvious over Maeda et al. in view of Imamura et al.

Claims 28-32 depend from claim 27, and thus also would not have been obvious over the references.

B. Claims 33-39

Claim 33 is directed to a soldering process comprising "a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and **a metal powder in the form of scales of which constituting elements are comprised of cores and coatings around the cores**, wherein the coatings are made of a metal which has a melting point higher than that of a solder material which forms the solder portion, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode". Thus, the process of claim 33 uses a flux which contains **a metal powder in the form of scales**.

As discussed above, Maeda et al. do not disclose a flux composition at all. Further, as discussed above, Imamura et al. teach a flux paste including a base flux and metal grains having diameters smaller than diameters of the projection electrodes, and having a thickness so as to form a space between the flux paste and the electronic part when the electronic part is mounted on the mounting substrate (see paragraph [0024]). Furthermore, the Imamura et al. reference

teaches that in the first embodiment, the solder bumps 112 have a ball shape and the **metal grains 116 also have a shape having a smooth surface (specifically, spherical shape) so as to easily move when the solder bumps 112 are pressed by the connection terminals 114** (see paragraph [0070]).

Accordingly, the references does not disclose or suggest "a metal powder in the form of scales", as recited in claim 33.

In addition, claim 33 recites a flux comprising a metal powder of which constituting elements are **comprised of cores and coatings around the cores**, wherein the coatings are made of a metal which has a metal point higher than that of a solder material which forms the solder portion".

The Examiner asserts that the grains in the Imamura et al. reference are reasonably taken to be "cores and coatings around the cores", and that there is no claim limitation that the coating must be visibly distinct from or a different material than the core (see Office Action, page 3, lines 13-19).

However, the Examiner's interpretation the grains disclosed in the reference is very unusual, far from the general understanding of grains in the art and beyond common sense. Moreover, paragraph [0065] of the reference specifically states that the flux is a normal soldering flux. Thus, one of ordinary skill in the art would not consider a "normal" soldering flux to be a flux comprising a metal powder in the form of scales "of which constituting elements are comprised of cores and coatings around the cores", as recited in claim 33.

Moreover, claim 39, which further defines the process of claim 33, recites "the **cores are made of tin** and the **coatings are made of silver**". Accordingly, the claimed process explicitly states that the cores and coatings are made from different materials.

Therefore, the process of claim 33 would not have been obvious over the references.

Claims 34-39 depend from claim 33, and thus also would not have been obvious over the references.

VIII. CONCLUSION

For the foregoing reasons, claims 27-39 are clearly patentable over Maeda et al. in view of Imamura et al. Accordingly, reversal of the final rejection is respectfully requested.

Attached hereto are a Claims Appendix, an Evidence Appendix and a Related Proceedings Appendix.

The brief is submitted with the required fee.

Respectfully submitted,

Tadashi MAEDA et al.

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IX. CLAIMS APPENDIX

1-15. (Canceled)

16. (Withdrawn) A flux for soldering which is placed between a solder portion formed on a first electrode and a second electrode when the first electrode is soldered to the second electrode, wherein the flux comprises:

a liquid base material comprising a resin component which is dissolved in a solvent,

an active component which removes an oxide, and

a metal powder made of a metal of which melting point is higher than that of a solder material which forms the solder portion, and

the flux contains the metal powder in an amount in the range between 1 % and 9 % by volume based on a volume of the flux.

17. (Withdrawn) The flux according to claim 16 wherein the metal which forms the metal powder is at least one selected from the group consisting of gold, silver and palladium each having a purity of not smaller than 90 %.

18. (Withdrawn) The flux according to claim 16 wherein the metal which forms the metal powder is unlikely to form a natural oxide film on a surface of the metal powder.

19. (Withdrawn) The flux according to claim 16 wherein the metal powder is in the form of thin pieces, scales or dendrites.

20. (Withdrawn) The flux according to claim 16 wherein the flux contains a rosin or a modified rosin as the resin component and the active component.

21. (Withdrawn) The flux according to claim 20 wherein the flux contains, in addition to the active component derived from the rosin or the modified rosin, other active component.

22. (Withdrawn) A flux for soldering which is placed between a solder portion formed on a first electrode and a second electrode when the first electrode is soldered to the second electrode, wherein the flux comprises:

a liquid base material comprising a resin component which is dissolved in a solvent,

an active component which removes an oxide, and

a metal powder of which constituting elements are comprised of cores and coatings around the cores,

the coatings are made of a metal of which melting point is higher than that of a solder material which forms the solder portion, and

the flux contains the metal powder in an amount in the range between 1 % and 9 % by volume based on a volume of the flux.

23. (Withdrawn) The flux according to claim 22 wherein the metal which forms the coating of the metal powder element is at least one selected from the group consisting of gold, silver and palladium each having a purity of not smaller than 90 %.

24. (Withdrawn) The flux according to claim 22 wherein the metal forms the coating of the metal powder element is unlikely to form a natural oxide film on a surface of the metal powder.

25. (Withdrawn) The flux according to claim 22 wherein the flux contains a rosin or a modified rosin as the resin component and the active component.

26. (Withdrawn) The flux according to claim 25 wherein the flux contains, in addition to the active component derived from the rosin or the modified rosin, other active component.

27. (Appealed) A soldering process with which a first electrode having a solder portion thereon is soldered to a second electrode, wherein the process comprises:

a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and a metal powder made of a metal which has a melting point higher than that of a solder material which forms the solder portion, wherein the metal powder is in the form of scales, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode,

a second step of aligning the first electrode with the second electrode so as to locate the flux between the solder portion and the second electrode,

a third step of heating so as to melt the solder portion, so that a molten solder material from the solder portion comes in contact with the second electrode, and

a fourth step of solidifying the molten solder material after the third step.

28. (Appealed) The soldering process according to claim 27 wherein the solder portion is a bump which is formed on the first electrode.

29. (Appealed) The soldering process according to claim 27 wherein the first electrode is an external connection electrode of an electronic part.

30. (Appealed) The soldering process according to claim 27 wherein the second electrode is an electrode of a circuit formed on a substrate.

31. (Appealed) The soldering process according to claim 27 wherein supplying the flux is carried out in a flux application step wherein a film of the flux is formed, and then a lower end portion of the solder portion is made in contact with the film.

32. (Appealed) The soldering process according to claim 27 wherein solidifying the molten solder material is carried out in a cooling step wherein the molten solder material is cooled.

33. (Appealed) A soldering process with which a first electrode having a solder portion thereon is soldered to a second electrode, wherein the process comprises:

a first step of supplying a flux comprising a liquid base material comprising a resin component which is dissolved in a solvent, an active component which removes an oxide, and a metal powder in the form of scales of which constituting elements are comprised of cores and coatings around the cores, wherein the coatings are made of a metal which has a melting point higher than that of a solder material which forms the solder portion, and the flux contains the metal powder in an amount in the range between 1% and 9% by volume based on a volume of the flux, to at least one of the solder portion and the second electrode,

a second step of aligning the first electrode with the second electrode so as to locate the flux between the solder portion and the second electrode,

a third step of heating so as to melt the solder portion, so that a molten solder material from the solder portion comes in contact with the second electrode, and

a fourth step of solidifying the molten solder material after the third step.

34. (Appealed) The soldering process according to claim 33 wherein the solder portion is a bump which is formed on the first electrode.

35. (Appealed) The soldering process according to claim 33 wherein the first electrode is an external connection electrode of an electronic part.

36. (Appealed) The soldering process according to claim 33 wherein the second electrode is an electrode of a circuit formed on a substrate.

37. (Appealed) The soldering process according to claim 33 wherein supplying the flux is carried out in a flux application step wherein a film of the flux is formed, and then a lower end portion of the solder portion is made in contact with the film.

38. (Appealed) The soldering process according to claim 33 wherein solidifying the molten solder material is carried out in a cooling step wherein the molten solder material is cooled.

39. (Appealed) The soldering process according to claim 33 wherein the cores are made of tin and the coatings are made of silver.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None